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We have

$$n \cos. (N + l) = \begin{cases} - [1'77616] & \text{for N. limit.} \\ - [1'76883] & \text{for central eclipse,} \\ - [1'76137] & \text{for S. limit.} \end{cases}$$

In these formulæ, as has been previously explained when presenting similar ones, all quantities within square brackets are logarithms; l is the *geocentric* latitude, or the geographical latitude diminished by the angle of the vertical; L the longitude from Greenwich, counted positive towards the east; and t results in mean time at Greenwich.

First, let it be required to find the latitude of the central line and the north and south limits in the longitude of the Observatory at Moscow, 2h. 30m. 17s., or 37° 34' 3" east of Greenwich.

Longitude	+ 37 34' 3"	<i>For North Limit.</i>	
Constant	- 75 51' 8"	Constant	- 1'77616
A	- 38 17' 5"	"	+ 1'94089
$n \sin. N$	+ 1'92757	Cos. (N + l)	- 9'83527
Constant	+ 1'43336	N + l	133 11' 0"
Cos. A	+ 9'89480	N	75 52' 9"
$n \cos. N$	+ 1'32816	l	57 18' 1"
Tan. N	+ 0'59941	Angle of vert.	10' 5"
N	75 52' 9"	Lat. of N. limit	57 28' 6"
Sin. N	+ 9'98668	<i>For South Limit.</i>	
"	+ 1'94089	Constant	- 1'76137
<i>For Central Line.</i>		"	+ 1'94089
Constant	- 1'76883	Cos. (N + l)	- 9'82048
"	+ 1'94089	N + l	131 24' 5"
Cos. (N + l)	- 9'82794	N	75 52' 9"
N + l	132 17' 4"	l	55 31' 6"
N	75 52' 9"	Angle of vert.	10' 8"
... ..	56 24' 5"	Lat. of S. limit	55 42' 4"
Add angle of vert.	10' 6"		
Lat. of central line.	56° 35' 1"		

In this manner by assuming other longitudes near that of Moscow we trace out the belt of totality.

Next, to find the times of beginning and ending of the total phase at any point in the vicinity. Calculating for the observatory of Moscow, the geographical latitude of which is + 55° 45' 3", we proceed thus:—

Geographical latitude	+ 55 45' 3"	Constant	- 23 34' 5"
Angle of the vertical	10' 7"	L	+ 37 34' 3"
Geocentric latitude (l)	+ 55 34' 6"	B	+ 13 59' 8"
Constant	- 1'92757	Constant	+ 1'43336
Sin. l	+ 9'91639	Cos. l	+ 9'75228
... ..	- 1'84396	Cos. A	+ 9'89480
No.	- 69'8167	... ..	+ 1'08044
... ..	+ 70'7604	No.	+ 12'0347
Nat. cos. w	+ 0'9437	Constant	+ 58'7257
Log. cos. w	+ 9'97483	... ..	+ 70'7604

Constant 1'87565	Constant - 3'11123	Constant - 3'81636
Sin. w ... 9'51962	Sin. l ... + 9'91639	Cos. l ... + 9'75228
... ..	... ..	Cos. B ... + 9'98691
1'39527	- 3'02762	- 3'55555
No. ... 24 ^s 8	No. ... - 1065 ^s 6	No. ... - 3593 ^s 8
... ..	- 3593 ^s 8	... ..
... ..	- 4659 ^s 4	... ..
... ..	h. m. s.	... ..
Constant	- 1 17 39' 4"	... ..
... ..	17 32 29' 6"	... ..
Long. E.	16 14 50' 2"	... ..
... ..	2 30 17' 0"	... ..
Middle .. 18 45 7' 2"	Moscow M.T.	... ..
... ..	± 24' 8"	... ..
Totality begins	18 44 42' 4"	" "
Totality ends	18 45 32' 0"	" "

GEOGRAPHICAL NOTES

THE *Japan Gazette* publishes an account of a visit recently paid by a Japanese steamer to the Bonin Islands, about which but little is known. Some eighteen months ago the Japanese took possession of the islands (which are in N. lat. 27°, about 520 miles from Yokohama), and established their head-quarters at Port Lloyd, Peel Island, which is the only harbour in the Bonins. The islands are described as high, rocky, and even mountainous; and the shores are, for the most part, precipitous, and lined with coral reefs. The vegetation is chiefly tropical, palms of various kinds being abundant. Wild goats and pigs abound on all the islands, and deer on one of them. Lemons, sweet potatoes, bananas, Indian corn, &c., thrive there; but the attempt to introduce cocoa-nut trees has not yet proved successful. On the return voyage the steamer visited the outlying Japanese island of Hachijo, which has an area of forty miles, and is said to contain 10,000 inhabitants. It is mountainous, and its sides to a great extent precipitous. At the northern end of the island there is a volcanic peak, rising to a height of 2,800 feet above the sea. The roads on the island are mere narrow and stony paths, and the people are poor. Three-fifths of the population are said to be women. Almost every available spot on the hill-sides in Hachijo is terraced and cultivated, but sufficient rice cannot be grown, so that sweet potatoes form one of the principal articles of food.

At the meeting of the subscribers to the African Exploration Fund held the other day, a resolution was passed to adopt the route recommended by the Committee, from Dar-es-Salaam, towards the northern end of Lake Nyassa, and thence, if possible, to the south end of Lake Tanganyika. The return journey might be made as far as possible along the valley of Lufigi. As we have already intimated, Mr. Keith Johnston, with whom will be associated another European, will lead the expedition, which will probably leave England in October next.

THE distribution of prizes of the Geographical Society of Paris, which had been postponed owing to the forthcoming exhibition, will take place at the Sorbonne on the 27th inst. Mr. Stanley, it is understood, will be present to receive the gold medal awarded him. The National Geographical Congress will take place in the beginning of September in the hotel built by the Paris Geographical Society, and which will be inaugurated on this occasion. It is said on good authority that the presidency of that Congress will be given to M. de Lesseps.